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James Holsinger, Jr., MD, PhD, Committee Chair

Linda Alexander, EdD, Director of Graduate Studies

RURAL HEALTHCARE WORKER'S WILLINGNESS TO REPORT TO WORK DURING CATASTROPHIC EVENTS

By

Aaron M. MacDonald

Final Examination:

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A capstone submitted in partial fulfillment
of the requirements for the
Degree of Masters of Public Health
in Health Management and Policy

Capstone Committee:

Dr. James Holsinger (Chair)
Dr. Sabrina Brown (Co-Chair)
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CHAPTER 1

INTRODUCTION

One of the most critical aspects when planning for a catastrophic event is the response of local and regional healthcare systems. The ability of a healthcare facility or system to handle a mass casualty situation is a crucial component in the overall post-disaster outcome for a city or region. It has often been assumed by both healthcare administration and the general public, that doctors, nurses, and other healthcare workers will always report to work when faced with a catastrophic event, and until recently, this fact was generally taken for granted. However, in the last 25 years public health and healthcare researchers have begun to examine the concept of willingness to report or rather who will actually report to work before, during, or after a catastrophic event such as a terrorist attack, pandemic illness, or natural disaster.

Background of the problem

Simply put, healthcare systems cannot function efficiently if they are not adequately staffed during disasters. Cape Canaveral Hospital, located on Florida's east coast, evacuated 5 times for hurricanes during a 9-year period. In 1999, during Hurricane Floyd, about 100 employees failed to work—and 30 were terminated (Chaffee 2009). Fortunately, Floyd did not directly impact the Atlantic Coast of Florida and the state was only lightly affected. Even though the impact of healthcare employees not reporting in this case was minimized due to the path of the hurricane, this is a prime example of the problems healthcare facilities face when catastrophic events occur.

On the other end of the spectrum is the success of the New York City healthcare system in the face of 2012's Hurricane Sandy. Under the central guidance of the Regional Emergency Medical Services Council of New York (NYC REMSC), healthcare facilities evacuated over 6000+

patients from different facilities around New York City before and during the storm (Diglio 2013). Widely praised for their efficiency during Hurricane Sandy, the New York City health system is an example of what fully functioning regional healthcare systems can accomplish when working at full capacity.

Statement of the problem

According to Chaffee (2009), the science concerning the phenomenon of willingness to work during or after disaster can be said to be “immature” or “emerging.” This issue has also been identified as an “untilled or undertilled” research area (Abramson, Morse et al. 2007). While the research is still emerging, it has to this point in time, focused entirely on large healthcare systems and/or large, densely populated urban settings. Thus far in the literature, geographically rural settings and small local healthcare systems have been entirely ignored. It can be assumed that healthcare workers in rural facilities will react similarly to their counterparts in urban settings, however, we cannot know for certain until research proves conclusively. While the threat of a terror attack or an outbreak of pandemic illness is smaller than in larger urban areas, healthcare systems in rural areas must still know what to expect from staff when planning for catastrophic events. Healthcare systems in rural areas, similar to urban healthcare systems, play a large role in the outcome of a catastrophic event and can still fail if not fully staffed during emergencies.

Purpose of the study

The goal of this study is to identify the barriers, both in ability and willingness that rural healthcare workers face before, during, or after a catastrophic event. This research will be a tool that healthcare administrators in rural settings can utilize to better prepare for catastrophic events by providing evidence that can be used to prepare policies and plans to ensure a fully staffed workforce during catastrophic events. This study will be the first willingness to report research

that has focused strictly on rural healthcare systems, facilities, and populations, thus helping to fill a gap in the willingness to report literature. This study will assist in a greater understanding of the overall concept of willingness to report.

CHAPTER 2

LITERATURE REVIEW

This section of the capstone is a summary of key concepts foundational to understanding the topic of healthcare workers willingness to report to work before, during, or after catastrophic events or disasters. This review represents the current state of willingness to report research gathered from the fields of public health, emergency management, emergency medicine, healthcare administration, and health policy. This review has been compiled using works collected from journals, books, and book chapters. The databases used to identify scholarly literature in these areas include Medline, Google Scholar, EBSCO, and the Library of Congress. The key words or phrases for these searches included: willingness to report, catastrophic event, post-disaster, terrorism, nursing, ability to report, and emergency medicine. A review of the bibliography led to a secondary review of works cited which contributed to the understanding of the concept.

The idea of examining healthcare worker's willingness to report to work during events that could be described as unique to our current era of healthcare was first performed during the early 1990s, immediately following the Gulf War. The initial willingness to report study was conducted in 1991 and looked at the relationship of nurses and childcare during wartime (Kater, Braverman et al. 1992). This study concluded that nurses would be more willing to report if the government would create and staff shelters specifically for children near healthcare facilities. A second study, conducted in post-Gulf War Israel concluded that 45% of healthcare workers would report during a possible chemical missile attack. However, with the addition of specific safety precautions, that number would increase to 86% (Shapira, Marganitt et al. 1994).

Shapira's study also found a stark contrast in willingness to report from facility to facility and suggested that the type of facility played an important role in an employee's attitudes towards reporting during crisis.

The reaction of public health researchers in the United States following the September and October 2001 attacks is similar to Israeli researchers following the Gulf War. Post-9/11 public health literature shows an obvious emergence of willingness to report research. There had been two willingness to report studies published prior to the events in September and October 2001; since those events, there have been 24 published studies (Chaffee 2009). The events of 2001 have established a clear delineation between apathy and interest in the topic of willingness to report.

The first appearance of willingness to report research in the literature post 2001 was published in 2002. Interestingly enough, this research was a reaction to Hurricane Floyd, which hit Florida and the United States East Coast in September of 1999, and not the 2001 terror attacks. This qualitative study determined that following a natural disaster, Florida Emergency Department (ED) nurses are primarily concerned with family and personal safety. This information confirms previous research that showed the importance of personal and family safety, however, this study also determined that pet care and safety could possibly prevent ED nurses from reporting to work. (French, Sole et al.2002). This was the first study to exam pet care as a possible barrier for reporting to work during catastrophic events. Subsequent studies have verified pet care as a major barrier.

In direct response to the emerging threat of terrorist attacks on US soil, willingness to report studies began to look at specific scenarios related to biological, chemical, radiological, and conventional terror attacks. Lanzilotti (2002) surveyed Hawaiian nurses and physicians with scenarios related to chemical or biological attacks. Lanzilotti determined that willingness to report was dependent on the event. Of those surveyed 86% were likely to report during a natural disaster. Far fewer were willing in a chemical (59% nurses/59% physicians), biological (53/56%), contagious epidemic (49/56%), or radiological incident (45/52%).

In 2002, Qureshi examined New York public health nurses and their willingness to report. The results of the study showed an increase in the number of nurses who claimed childcare as a barrier (32%), but otherwise the barriers remained consistent with previous studies: personal safety (14%) and transportation (14%) (Qureshi, Merrill et al. 2002). This study did, however, discover that public health workers would be 12% more willing to report to work (70% vs. 82%) if emergency preparedness training was provided beforehand.

The initial wave of willingness to report studies focused primarily on the beliefs of workers and if they would decide to physically report or not. These studies did not take into account healthcare workers who must respond directly to disasters (first responders) and those who are already working at healthcare facilities when the first patient is brought in. DiGiovanni published the first study looking specifically at the reactions of healthcare workers to a terrorist act (DiGiovanni 2003). The study reported in “The Spectrum of Human Reactions to Terrorist Attacks with Weapons of Mass Destruction: Early Management Considerations” determined that 95% of healthcare workers would remain on duty provided that they received information about

medical issues, their worksites were protected, and the community was unlikely to be exposed to another act of bioterrorism.

“Health Care Workers’ Ability and Willingness to Report to Duty during Catastrophic Disasters” (Qureshi, Gershon et al. 2005) is considered to be the seminal work in the willingness to report field as well as the most widely cited research on willingness to report. This study examined healthcare facilities and workers in New York City. Qureshi’s study was the first to differentiate between workers willingness to report and their ability to report. The study defined willingness as “a personal decision to report to work” and ability as “the capability of the individual to report to work.” One of the most often cited statistics to come from this study is that over half the respondents to the survey reported childcare to be one of the largest barriers in both willingness and ability to report.

In 2006, Cone and Cummings published “Hospital Disaster Staffing: If You Call Will They Come?” The authors sent a 12 question survey to various hospital workers. The authors found 87% of respondents were willing to work after a fire/rescue/collapse mass casualty incident and 58% were willing to work in a biological or chemical event. 75%–82% of respondents were willing to work in various natural disasters or weather-related events. What made Cone and Cummings study noteworthy was that it was the first study to list pet care obligations (33%) as a bigger barrier to report than childcare (30%). This fact could be due to a number of reasons, primarily the population surveyed, but it still stands to illustrate the importance of pet care when planning for disaster staffing.

In 2007, researchers introduced a financial variable into willingness to report research. Irvin administered a survey to hospital workers in California that determined that 50% of survey respondents would not be willing to work during an avian flu outbreak. Of those 50%, 18% would still not report to work even if a financial incentive, up to triple the normal wage, was offered (Irvin, Cindrich et al. 2008).

Through 2007, the willingness to report literature had focused primarily on healthcare facilities and the people who worked within them. In 2008, Gershon became the initial researcher to look outside the boundaries of traditional healthcare systems and into non-traditional healthcare settings such as home healthcare. “Home Healthcare Challenges and Avian Influenza” reported the willingness of home healthcare workers and nurses to report to work during an avian flu outbreak. This study determined that only 11% of home healthcare workers and 37% of home health registered nurses would be willing to work with a home health patient with suspected avian flu.

As the literature demonstrates, researchers have overwhelmingly focused on large healthcare systems, large urban areas, or both. This is perhaps due to the larger and more complex threat of a catastrophic event, whether that is a terror attack, pandemic outbreak, or natural disaster, affecting a larger segment of the population at a given time. It is certainly of the utmost importance to understand how healthcare systems in these areas will operate under duress. However, understanding how healthcare systems in rural geographic regions will operate during catastrophic events is just as critical to the response before, during or after a disaster. Examining the willingness of rural healthcare workers to report to work will contribute to the overall

understanding of the concept of willingness to report as well as assist rural healthcare facilities in the creation of emergency plans and policy.

CHAPTER 3

METHODOLOGY

Rural facilities were identified using the US Department of Agriculture Rural-Urban codes or in areas that lacked a major urban center. Once facilities were identified, an email or phone call was made to the facility to gauge interest in research participation. Each facility was asked to designate a point-of-contact person or department. Written consent was received from each participating facility prior to participation. Surveys or links to the REDCap survey were emailed or mailed to each participating facilities point-of-contact. REDCap (Research Electronic Data Capture) is a web application for building and managing online surveys and databases. Once these were received, each facility was granted freedom to distribute as they saw fit. In some cases the surveys were sent out system-wide and in other cases they were distributed to select employees.

The survey was initially designed as an electronic only survey using the REDCap system. The original concept was to utilize employee email addresses to send and receive the survey. This plan was amended when we discovered that not all of the facilities contacted used employee email. One facility requested that the survey be sent by mail rather than email. We made a few small changes to the language of the survey itself and the introductory letter and sent a number of surveys through mail with instructions for completing and returning the survey. The survey was completely anonymous, regardless of whether we received the survey through mail or REDCap. Once received, the surveys were manually entered into the REDCap system. The survey design was examined and approved through the University of Kentucky Medical Institutional Review Board.

Previous willingness to report studies have restricted their populations to specific professions within healthcare systems, i.e. only nurses or only physicians. Because our study was the first to exam rural populations, the decision was made to include any employee, at least 18 years of age, who was employed by a healthcare facility whether or not they provided direct patient care or not. The reasoning for including all employees was two-fold. First, the aim of the initial research into rural healthcare was not to understand a specific profession but rather to gain a general understanding of rural healthcare as a whole. Secondly, it was important to understand how different employees in different roles viewed the willingness to report scenarios. Roles that provide direct patient care are often viewed with more critical importance to the function of a healthcare system during an emergency; however, each position in a healthcare system is crucial to the overall efficiency of a system during a crisis. Therefore, it is important to understand how each position within a healthcare system responds to a catastrophic event.

We utilized an existing survey originally designed for use in Qureshi's 2005 willingness and ability to report study of the New York health system. With Qureshi's permission we modified her Disaster Survey for use in our rural population. The survey is a 28 question tool with 25 multiple choice questions and 3 fill-in-the-blank answers. The survey was designed to address the following: (1) demographics, (2) ability and willingness to report to work during different types of catastrophic events, (3) barriers to ability and willingness, (4) fears and concerns about becoming ill or injured while reporting during chemical and bioterrorism events (Qureshi, Gershon et al. 2005). We took Qureshi's original scenarios and modified them in order to reflect a more geographically probable series of events. Our scenarios include: severe weather,

smallpox outbreak, chemical terror attack, environmental disaster, mass casualty incident, and a radiation incident. These scenarios are described in greater detail in Table 1.

Survey participants were instructed to answer all questions and to either return to their facilities point-of-contact person or to submit electronically if using REDCap. Demographic information collected included profession, age group, responsible for dependents, profession, and time in healthcare. The survey included no personal information and was completely anonymous. If the survey was completed as a paper copy, the data was entered into REDCap manually. The average time to complete the survey fell between 3 and 5 minutes.

The goal of our research was to gain a broad understanding of how rural healthcare facilities and employees will function when faced with a catastrophic event. Future research studies can focus on how specific facilities, such as hospitals, emergency rooms, long-term care facilities, etc. respond to catastrophic events. Also, future willingness to report research can narrow the focus to specific professions within healthcare. Finally, similar to past willingness to report research, future research can target catastrophic events that may be prone to occurring in certain rural geographic regions versus the general scenarios that our survey contained.

CHAPTER 4

RESULTS

A convenience sample of 35 healthcare employees and healthcare students from six different facilities returned surveys. Surveys were returned over a four week time frame. The six facilities included three hospitals, two long-term care facilities, and a university-based physician assistant medicine program. Two-thirds of the hospitals were located in Eastern Kentucky and one was located in Southeast Ohio. Both long-term care facilities and the university-based physician assistant medicine program were located in rural Kentucky counties.

Our respondents were largely female (78.8%), full-time employees (79.4%) with a majority working an 8 hour day shift (61.8%). The bulk of returned surveys were from either the 18-30 (35.3%) or the 31-44 age groups (32.4%). Our sample population would be considered experienced employees, averaging nearly 10 years in healthcare (9.7%) and 4.1 years at their current facility. The largest proportion of respondents fell into the nursing (26%) and support staff categories (nursing assistants, medical assistants, etc.) (25%). This was followed by administration (17%), EMTs (8%), and physicians (6%). The “other” category (18%) saw an increase as students were included in the survey due to the survey not including a “student” category. Although these surveys were anonymous, we believe that the other category could essentially be relabeled as a “student” category. The students who participated in the survey are in the University of Kentucky physician assistant program at Morehead State University. Upon graduation these students are encouraged, but not obligated, to practice in rural settings. When creating the survey we did not anticipate using students in the survey, however, with low

participation rates, an opportunity to utilize these future healthcare providers was presented and provided a unique perspective on our survey.

Half of our respondents indicated that they have dependent care responsibilities (50%).

Dependents for this survey's purpose included children, elderly, and persons with intellectually disabilities. Nearly half of those reported dependents are 13 or younger (48%), with the average age being 11 years of age. Our respondents did not report any elder obligations. The oldest dependent age listed was 39 years-old. Nearly one-fourth (23%) of our sample population has a spouse or significant other who would be expected to report to work during a catastrophic event. A complete sample description is provided in Table 2.

This survey included questions regarding willingness to work additional shifts and willingness to work at hospitals or healthcare facilities outside of the respondent's normal employment setting. The majority of respondents would be willing to work in an outside hospital during a catastrophic event (83%). Our research shows that rural respondent's willingness to work at outside facilities, which decreases with distance away from home, is similar to Qureshi's 2005 research findings for urban populations. Survey participants were overwhelmingly willing to work in hospitals local to where they live (84%) but less willing to work in hospitals geographically close to where they work (68%). Of our survey respondents, 65% were willing to work in another county and just over half (55%) were willing to work in another in state.

Regardless of scenario, less than half of our sample population would be *able* to report to work following a catastrophic event (43%). When broken down by specific scenario (Table 3),

respondents would be most able to report for a smallpox outbreak (54%), followed by a large industrial fire (51%), chemical terrorism event (49%), snowstorm with 3 feet of accumulation (40%), large explosion of unknown cause (34%), and least likely to report for a radioactive explosion within 50 miles (31%).

Table 1: Catastrophic disaster scenarios used for rural healthcare facilities in rural areas (Qureshi's Disaster Survey modified for rural populations)

Type of Event	Scenario
Weather Emergency	Snow storm with 36 inches of snow in a 24-hour period occurs where you live
Bioterrorism	Smallpox outbreak in Eastern Kentucky
Chemical Terrorism	Chemical terrorism in Eastern Kentucky
Mass casualty incident	Large explosion, of which the cause is unknown, in the largest town in your county
Environmental disaster	Large industrial fire that causes thousands to suffer smoke inhalation
Radiation terrorism	Radioactive bomb explodes within a 50 mile radius of your home, thousands head to medical facilities to be treated or checked for radiation poisoning

Table 2: Respondent Demographics

	N=35	Percentage
Employee Status		
Full-time	27	77
Part-time	1	2.9
PRN	3	8.6
Other	5	14.3
Shift (primary)		
Day	27	77
Evening	3	8
Night	1	3
Other	5	14
Gender		
Male	7	20
Female	27	79
Age group		
18-30	13	37
31-44	11	31
45-64	10	29
65+	1	3
Years in health (all/at facility)		
Mean	10.3/4.5	
Median	8/3	
SD	10.2/4.1	
Occupational category		
Nurse*	9	26
Support Staff^	9	25
Administration	6	17
Physician	6	6
Other\$	5	18
EMT	3	8

*includes other clinical staff (physician assistant/nurse practitioner/etc.)

^includes nursing assistants & other professional staff

\$includes all occupations not included above

Even fewer of our sample population would be *willing* to report following a catastrophic event (39%). Employees were more willing to report to work following a large industrial fire (54%) followed by an explosion of unknown cause (51%), smallpox outbreak (42%), equal willingness to report between a chemical terrorism event and a 3 foot accumulation snow storm (31%), and least willing to report for a radioactive explosion (23%).

Similar to asking our sample population about ability and willingness to report during specific scenarios, the participants were asked to answer questions about the reasons why they would not be able or willing to report to work. The main barrier in ability to report was child care (48%) followed by transportation and other (30%), pet care (11%), and personal health problems (7%).

The main barrier in willingness to report to work during a catastrophic event was overwhelmingly fear/concern for family (67%) followed by fear/concern for personal safety (54%), other (8%), and personal health (4%).

Table 3: Ability and willingness by event type*

	36" snow N (%)	Smallpox N (%)	Chemical N (%)	Explosion N (%)	Fire N (%)	Radioactive N (%)
Ability						
Able	14 (40%)	19 (54%)	17 (49%)	12 (34%)	18 (51%)	11 (31%)
Unsure	2 (6%)	2 (6%)	21 (20%)	6 (17%)	3 (9%)	8 (23%)
Not able	11(31%)	1 (3%)	0 (0)	3 (7%)	0 (0)	4 (11%)
Willingness						
Willing	11 (31%)	15 (42%)	11 (31%)	18 (51%)	19 (54%)	8 (23%)
Unsure	1 (3)	1 (3%)	2 (6%)	2 (6%)	1 (3%)	4 (11%)
Not willing	2 (6%)	4 (11%)	4 (11%)	1 (3%)	1 (3%)	8 (23%)

*due to either unclear directions or other causes, this question in the survey was incompletely answered by 21 participants.

CHAPTER 5

IMPLICATIONS FOR PUBLIC HEALTH

Our research showed that childcare and transportation as the two biggest barriers to ability to report and fear for family and fear for self as the two biggest barriers in willingness to report. Unfortunately, at this current time there does not appear to be a consistent set of baseline numbers in the willingness to report research. However, the primary barriers to rural healthcare workers that we have identified in this study appear to be similar to the barriers that urban healthcare workers identified in previous willingness to report studies.

When compared to Qureshi's 2005 study, our ability and willingness to report by event type numbers differ drastically. In the 2005 study, 65% of urban healthcare workers were able to respond, regardless of scenario. In rural healthcare workers, 43% were able to respond regardless of scenario. In Qureshi's willing to respond category, 72% of respondents were willing to respond regardless of scenario. In our study, 39% of rural healthcare workers were willing to respond, regardless of scenario.

We predicted that the both ability and willingness barriers would not differ greatly in rural population as compared to urban populations. Childcare, transportation, fear for family, and fear for self are universal barriers and qualities and not specific to any one region or population. We anticipate that any future study, regardless of facility, situation, job category, and geographic location will find the same results when examining ability and willingness barriers.

Recommendations

The goal of our research was to gain a broad understanding of how rural healthcare facilities and employees will function when faced with a catastrophic event. Future research studies can focus on how specific facilities, such as hospitals, emergency rooms, long-term care facilities, etc. respond to catastrophic events. Also, future willingness to report research can narrow the focus to specific professions within healthcare. Finally, similar to past willingness to report research, future research can target catastrophic events that may be prone to occurring in certain rural geographic regions versus the general scenarios that our survey contained.

Healthcare leaders in rural areas can begin to use our findings to implement strategies into their facilities that will help employees report to work during catastrophic events. In order to overcome the barriers to ability to report, facilities can offer childcare services when operating under states of emergency. Non-essential staff can volunteer or be assigned childcare duties during these times. Supplies (diapers, books, baby food, toys, books, crayons, etc.) and locations can be secured prior to a disaster so that they can be utilized when needed.

Transportation issues can be addressed as well. Ideally, employees will utilize a carpool system when necessary. In rural geographic areas, transportation with four-wheel drive vehicles is often needed. Employees who own four-wheel drive vehicles can be identified prior to disaster and asked to lead carpools or make extra trips to secure employee transportation. Depending on the disaster, ambulances, police vehicles, and service vehicles can be used to aid in employee transportation. Healthcare facilities may be able to contact emergency services to gauge whether or not they can assist in couriering employees to work.

The unwillingness of an employee to report to work based on fear of family or fear of self are difficult barriers to overcome. According to our survey results, those that do choose to provide care do so because of a sense of responsibility (51%), a code of ethics (45%), or because of their ability to provide direct patient care (37%). Previous studies have demonstrated that, besides intrinsic motivation, there are extrinsic factors that can increase an employee's willingness to report.

Educating employees regarding possible threats, treatments, and risks has been shown to increase willingness to report. DiMaggio (2005) reported that healthcare workers who had received terrorism-related training with twice as willing to respond as those who had no training. Another factor that increases willingness to report is access to proper equipment. Schechter (2007) reported that lack of Personal Protective Equipment (PPE) was a major barrier in the willingness of healthcare workers to report but Mackler (2007) found that 91% of healthcare workers would be willing to work if fully protected by both PPE and vaccine.

Limitations

There were several limitations to our study. In the exploratory phase of this project, a decision was made to limit our sample size to between 30-50 participants. The reasoning for this small sample size was mainly due to time constraints in the graduate capstone process. Due to the small sample size from six separate facilities, the ability to make generalizations for other rural healthcare facilities based on our study is limited. Also, our sample population was not identified until later in the research process. Having more time to conduct surveys would most

likely have led to a larger, more diverse sample size and an ability to secure a broader range of research sites.

Another issue that arose during the research phase of this project was a lack of participation.

When a facility agreed to participate in our research, a point-of-contact individual was designated to distribute the surveys; our only means of contacting the facility was through this person. The surveys were sent to this person and it was their responsibility to distribute them as they saw fit. We were never made aware how many surveys were actually distributed, which in hindsight was an error on our part. It would have been more efficient for us to have access to an employee email database or listserv so that we had control over the survey as well as control over the reminders that were sent out. Using previous research as a guide, we assumed a survey response return rate of approximately 30%. However, based on our final sample size of 35, we have concluded that we had a response rate closer to 5-10%.

Conclusion

Rural healthcare facilities and rural healthcare workers play an absolutely critical role in disaster response regardless of geographic region. The fact that rural healthcare facilities are often geographically isolated compounds this role during catastrophic event. However, in many cases, rural healthcare is last aspect of the national healthcare system to be examined through primary research. Our expectation is that this research can assist rural healthcare facilities in planning for future catastrophic events as well as serve as the catalyst for future rural healthcare research.

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